RIA-AstroMadrid 3. Low-resolution spectroscopy of M dwarfs with CAFOS at Calar Alto

F. J. Alonso-Floriano\textsuperscript{8}, A. Klutsch\textsuperscript{8}, D. Montes\textsuperscript{8}, J. A. Caballero\textsuperscript{10}, J. C. Morales\textsuperscript{4}, M. Cortés-Contreras\textsuperscript{8}, R. Mundt\textsuperscript{1}, I. Ribas\textsuperscript{4}, A. Reiners\textsuperscript{5}, A. Quirrenbach\textsuperscript{3}, P. J. Amado\textsuperscript{2} and the CARMENES Consortium\textsuperscript{1,2,3,4,5,6,7,8,9,10,11}

1Max-Planck-Institut für Astronomie • 2Instituto de Astrofísica de Andalucía • 3Landessternwarte Königstuhl • 4Institut de Ciències de l’Espai • 5Institut für Astrophysik Göttingen • 6Instituto de Astrofísica de Canarias • 7Thüringer Landessternwarte Tautenburg • 8Universidad Complutense de Madrid • 9Hamburger Sternwarte • 10Centro de Astrobiología • 11Centro Astronómico Hispano-Alemán – Calar Alto Observatory

We conduct long observational campaigns with CAFOS at the 2.2. m Calar Alto telescope to obtain low-resolution (R ∼ 1500) spectra of poorly-known M dwarfs and candidates that are bright enough to be considered as potential CARMENES targets. We perform a spectral-type classification of the targets by comparing their acquired spectra with those of spectral-type standard stars observed during the same observing runs, and using spectral indices well calibrated for M dwarfs, such as TiO-\textsuperscript{n}, CaH-\textsuperscript{n}, VO-\textsuperscript{n} and PC-\textsuperscript{n}. We also measure chromospheric activity indicators. Up to now, over 700 M dwarfs have been observed and analysed, many of which had not been spectroscopically investigated yet.

Top left. Comparison of wavelength coverage of CAFOS (top), PMSU (middle) and MILES (bottom); we lose H\textsubscript{δ} and the Ca H&K doublet at the bluest end, but win the alkali doublet at the reddest end. ▶ Top middle. Example of a best-spectral-type cross-match with our CAFOS data; for each half subtype, we have defined three reference stars, of which one is a prototype standard star. By comparison with PMSU, our spectra-typing uncertainty is 0.5 subtype. ▶ Top right. Distribution of stars in CARMENCITA (poster 2) as a function of spectral type and its origin (blue: CAFOS; yellow: PMSU; red: other sources).

Bottom left. Four representative spectral index-spectral type diagrams; for each CAFOS spectrum, we derive 28 spectral indices (Kirkpatrick et al. 1991; Reid et al. 1995, Martin & Kun 1996; Martin et al. 1996, 1999, Hawley et al. 2002; Lépine et al. 2003; Slesnick et al. 2006; Shkolnik et al. 2011; Seeliger et al. 2011), which complement our \chi^2 and best-match SpT determinations. ▶ Bottom middle. Comparison between spectral types measured by us on CAFOS spectra and determined by Lépine & Gaidos (2011) from \langle V \rangle - J colour. ▶ Bottom right. H\alpha index as a function of TiO5 index (i.e., spectral type) for our preliminary CAFOS sample.

http://carmenes.caha.es/